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ABSTRACT

Two experiments investigating the efficiency of communication between 5th grade children from differing socioeconomic (SES) backgrounds are described. In each experiment, 40 same-sex pairs, half male and half female, were formed into dyadic groupings by combining lower- and middle-SES children into the four possible speaker-listener combinations. The task required one child to locate a toy car in a model city from the verbal description of another child. Task success depended on the efficiency of verbal communication of the pair. The listener was allowed to give feedback in the second experiment only. SES combination main effects were observed only for the number of errors made in Experiment 1, with the lower-SES-speaker, middle-SES-listener dyad making the most errors. Sex main effects showed general superiority of the girls in the no-feedback experiment. Content analyses of speaker and listener messages revealed several sex by SES interactions in Experiment 2. Results indicate that a complex, concrete task of this kind elicits similar levels of communication efficiency in children of varying social background but suggest that different communication strategies may be employed toward the same end. (Author/BF)

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Communication Efficiency in Children: A Function of Individual Skill or Dyadic Interaction?

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Running head: Communication Efficiency in Children

Abstract

Two experiments investigated the efficiency of communication between children from different social class backgrounds. In each experiment, forty same-sex pairs of fifth-graders--one-half boys and one-half girls--were formed into dyadic groupings by combining lower- and middle-SES children into the four possible speaker-listener combinations. Task success depended on the efficiency of the verbal communication between the pair. The listener was allowed to give feedback in the second experiment but not in the first. SES combination main effects were observed only for the number of errors made in Experiment 1, the lower-SES speaker middle-SES listener dyad making the most errors. Sex main effects showed general superiority of the girls in the no feedback experiment. Content analyses of speaker and listener messages revealed several sex by SES interactions in Experiment 2. The results indicate that a complex concrete task of this kind elicits similar levels of communication efficiency regardless of social class background, but suggests that different communication strategies may be employed toward the same end.

Communication Efficiency in Children

A Function of Individual Skill or Dyadic Interaction?

Communication skills have generally been considered essential to school success. Although it has been proposed that the lower-socio-economic status (SES) child's frequent difficulties in school are related to inferior communication abilities (Bernstein, 1961) the evidence on this is inconclusive. Glucksburg, Krauss, and Higgins (1975) concluded in a summary of the literature concerning referential communication that differences among SES groups in communication skills have not been clearly demonstrated. While findings are not perfectly consistent, however, numerous studies have reported considerable differences between lower-SES and middle-SES children's abilities to communicate a message (Loban, 1964; Krauss and Rotter, 1968; Heider, 1971; Baldwin, McFarlane and Garvey, 1971; Pozner and Saltz, 1974).

Lower-SES children have in past studies of communication talked less (Jones and McMillan, 1973; Lawton, 1968) and communicated fewer of the critical descriptive attributes of such stimulus materials as pictures (Baldwin, et al., 1971) or rules of a game (Pozner and Saltz, 1974) than middle-SES children. Another common finding has been that lower-SES children did not adapt their message to the needs and perspective of the listener as readily as middle-SES children. This apparent difficulty in considering the perspective of the listener, termed egocentrism, has been a persistent theme in findings of social class differences in communication (Flavell, 1968; Krauss and Rotter, 1968; Heider, 1971; Pozner and Saltz, 1974).

Unfortunately the research to date has more successfully demonstrated SES differences in children's communication skills than it has provided explanations for those differences when found. Cognitive development or intelligence has been proposed as one possible explanation for the frequently found inferior communication skills in lower-SES children. The evidence on this is contradictory: while Pozner and Saltz (1974) and Baldwin et al. (1971) found SES differences remained when IQ was held constant, Ruth (1966), Higgins (1973) and Johnson (1974) all report that no SES differences in communication effectiveness were found when intelligence test scores did not differ for the two groups.

The experimental setting itself is never mentioned as a possible explanation for SES performance differences in spite of a considerable body of literature (Johnson, 1974; Labov, 1970; Zigler et al., 1973) that demonstrates the debilitating effect of an artificial, and perhaps threatening experimental setting on lower-SES children. Motivational factors have been shown to play an important role in the performance of children on cognitive tasks and generally to militate against lower-SES children (Seitz et al., 1975; Zigler and Butterfield, 1973). Motivation factors are particularly relevant to communication studies, because they include aspects which have been shown to work against the lower-SES child. Children are typically removed from their classroom by a complete stranger and asked to perform on such artificial and unrealistic tasks as giving a name for an abstract symbol so that a hypothetical listener can select it from an array (Krauss and Rotter, 1968; Heider, 1971), or describing the rules of a game to a mute listener (Pozner

and Saltz, 1974).

It is possible that the middle-SES child finds such tasks just as bizarre and irrelevant to his life as the lower-SES child, but because he is more comfortable in the experimental situation and more motivated to perform in the school setting regardless of the absurdity of the task, he will perform up to his ability level. The lower-SES child, on the other hand, may be less comfortable in the strange situation and less motivated to perform for the sake of performing.

A particularly artificial aspect of the usual communication tasks is lack of feedback. In most of the research studying social class differences in communication, encoding and decoding the message are separately considered. The decoder has no opportunity to ask questions or request additional information of the encoder, and the encoder is likewise denied any kind of feedback concerning the adequacy of his message. Normal communication situations do not impose such restrictions on verbal communication.

In this kind of assessment, communication ability is essentially treated as a unitary trait of the child. Such a treatment does not permit consideration of the highly social and interpersonal nature of communication in real life. Although particular skills, such as being able to take the listener's point of view, or selecting the critical information necessary for communication, are clearly important components of efficient communication, even these abilities probably interact with situational, or social factors. Since communication is an interactional and social phenomenon, it is important that it be studied as such. The child's performance on unnatural

unidirectional tasks may be unrelated to his ability to communicate in realistic interactive situations. Perhaps in a more natural situation, the lower-SES child is more motivated and performs as skillfully in communicating information as the middle-SES child. An interactional analysis does not allow independent assessments of encoding and decoding, but it is necessary for an understanding of verbal communication efficiency as it occurs in the real world. It seems highly probable that the type of task and interpersonal characteristics of the dyad are as relevant to efficient communication as the skill of the speaker.

The studies to be reported here were designed to investigate the importance of the nature of the task and the social interactional aspect of communication between children. The central issue being addressed is whether the performance of children on a motivating, realistic, two-way communication task would change the nature of past conclusions about the relative communication skills of different classes of speakers.

In order to minimize possible experimental or task characteristics that might put the lower-SES children at a disadvantage, a task was constructed so that children could differentiate the stimulus materials by the use of simple vocabulary items common to all fifth graders. The materials consisted of a colorful model city and the task was set up as a game with a clearly defined goal. The task also simulated a communication task commonly confronted in the real world, i.e. giving directions.

In order to compare the performance on an interpersonal task to a more artificial unidirectional task two experiments were run, one in which

the listener was not allowed to give feedback and one in which the participants were both allowed to speak without any limitations.

NO-FEEDBACK EXPERIMENT

Method

Subjects

The sample consisted of 80 white, native English speaking fifth-graders, divided equally between lower- and middle-SES background, based primarily on parent occupation according to the Hollingshead Two Factor Index of Social Position (1957). Families of the children in the lower-SES group would be most accurately characterized as working class. One-half of the subjects in each SES group were boys and one-half were girls.

Children from seven elementary schools in largely white urban and suburban neighborhoods bordering New Haven, Connecticut were included on the basis of parental permission and the availability of SES information and group IQ scores in the school records. Children of both lower- and middle-SES were included from each school, but most schools tended to be characterized primarily by children from one or the other SES group.

The 40 pairs were evenly divided into eight groups according to sex (M-F) and SES speaker-listener combination.

Apparatus

Two identical model cities were used for the task. The cities were built on a 47 x 60 cm piece of plywood. Buildings made of painted styrofoam varied in size, color (red, gray or red with white stripes), shapes (rectangular or L), roof color, and the color and number of doors and

windows. As shown in Figure 1, there were also a network of roads painted gray, two different kinds of trees, a railroad track, signs, telephone poles, fire hydrants, and a park. About one-third of the board was covered with grass.

Insert Figure 1 about here

Procedure

Children from the list of eligible subjects were randomly paired prior to the running of the experiment, the only constraint being that close friends were not paired together. Subjects came in same-sex pairs from the classroom to another room in the school building and were greeted by a female experimenter. The subjects in each pair were randomly designated speaker or listener.

The two children faced identical views of the model cities placed on a table with a partition dividing the two cities and extending out towards the children so that they could see neither each other nor the other child's city. The experimenter sat across the table facing the two children. The two children were told that the experimenter was interested in trying out a game on fifth-graders. A small car was placed in the city of the child designated speaker and in the hand of the child designated listener. The children were given standard instructions on how to play the game, explaining that the speaker must describe where his car was placed so that the listener could place his own car in the corresponding location in his own city. The listener was not allowed to say anything and the game continued until the listener correctly placed his car in his own city.

All pairs began by playing one practice game. Instructions were repeated in cases where it appeared that the subjects had not understood. The car was placed in the same position for all pairs and a tape recording was made of all the trials.

Coding and Analysis of the Data

Because all pairs were allowed to continue until the task was successfully completed, the measures of success were the amount of time used to complete the task and the number of errors made. Time was selected rather than total number of words so that the success of the pairs in the no feedback experiment could be compared to the success of the pairs in the feedback experiment.

A content analysis of the communication was carried out from transcripts of the tape recordings. The speaker's communication was first divided into semantic units. A unit was defined according to Watts (1948) as a "group of words which cannot be further divided without the loss of their essential meaning." Words which were not a part of a meaningful communication unit, such as false starts, were counted as maze words (Loban, 1963), and were not included in the analysis. Of the total 40 transcripts, 20 were randomly selected to be judged by two independent judges. Agreement on units was found for 92% of the units coded by each of the two judges.

Each unit was then coded for its content according to the following scheme of non-overlapping categories:

Egocentric The speaker appeared to have assumed that the listener knew exactly what the speaker was referring to even though it had not been specified. Examples of egocentric units are: "it's up from there" "it's next to the hospital" (no building was labeled hospital). The measure used in the analysis was the proportion of egocentric units over all units.

Uninformative Units were coded uninformative if the information was very ambiguous and of little discriminative value, such as "it's on a road that goes off the board" (all roads go off the board), or "it's near some grass" (the board is covered with grass).

Informative Those units which contained useful qualifiers were coded as informative. Because the speaker achieves greater efficiency (more information with fewer words) by including more than one useful qualifier in a unit, a distinction was made between units with one qualifier (eg. "it's next to a tall tree"), and units with more than one qualifier (eg. "next to the red house with white windows"). The measure used in the analysis for each information content code was the proportion of the number of units given a particular code to the total number of non-egocentric units.

Coding practice for two judges involved simultaneous coding of the transcripts of five initial pairs. Raters agreed on 86% of the total units coded from the 20 randomly chosen transcripts coded independently.

Results

Success measures

A two-way analysis of variance was performed for each of the two success measures and four content codes. The independent measures were sex and SES combination of the pair.

Significant main effects on the error measure were found for both SES combination and sex. Table 1 shows the number of errors by sex and SES combination. (To reduce skewness, all scores were transformed for analysis to (log (x + 1)).

Insert Table 1 about here

The girls made fewer mistakes than the boys, F (1, 32) = 8.07, $p < .01$. The main effect for SES combination, F (3, 32) = 3.11, $p < .05$, resulted mainly from the relatively large number of errors made by the lower-middle-SES dyad, twice as many as any other dyad.

A similar sex main effect was found for the amount of time used to complete the task, boys taking nearly three times as long as the girls, F (1, 32) = 9.21, $p < .01$. No SES combination main effect was observed for the time measure. It is noteworthy, however, that the two success measures, time and errors, were highly correlated with each other, $r = .72$, $p < .001$.

Content measures

Pearson correlation coefficients were computed for each of the content measures with the two success measures. The resulting correlations were in the expected direction; egocentric and uninformative units

were both positively correlated to errors and time. The correlation coefficients and their significance level is seen in Table 2. (All content measures were transformed by the arcsin transformation for analysis).

Insert Table 2 about here

The analysis of variance performed for each of the content measures showed a sex main effect for the proportion of egocentric units, F (1, 32) = 4.94, $p < .05$. A marginal sex main effect in the same direction was observed for the proportion of uninformative units to total nonegocentric units. Mean proportions for content codes by sex and their significant test values are seen in Table 3. No SES combination main effects of interactions were observed for content measures.

Insert Table 3 about here

FEEDBACK EXPERIMENT

Method

Subjects

The sample of 80 children was drawn in the same way from the same population as in the no-feedback experiment. Pairs of subjects were placed according to sex and SES combination into one of eight groups as previously described.

Apparatus, Experimental Task and Procedure

The apparatus and task were identical to that employed in the first experiment in every way, with the exception that the listener was allowed to speak freely in the present experiment.

Coding and Analysis of the Data

The measures of success were the same as in Experiment 1: the amount of time used to complete the task and number of errors made.

A content analysis was made of both the speaker's and the listener's speech. The analysis for the speaker was identical to the analysis in Experiment 1, except for the addition of one coding category. Those units which were simple responses to a previous question of the listener, such as "yea, right there," or "no, it's not red," were coded as response units. The proportion of response units to total units was analyzed; the total units figuring in the analysis of the other content codes excluded the response units. The agreement between the two raters on 20 of the total 40 transcripts was found on 85% of the total speaker units coded.

In Experiment 2, the number of words spoken by the listener were also counted. Listener verbalizations were then coded in one of the following mutually exclusive categories: a question (e.g., "is it near the railroad track;"); an affirmation or negation (e.g., "yea, I see it"); information (e.g., "but there are four red houses"); or repetition (simple repetition of the speaker's previous communication). Listener units were originally also coded as egocentric for the same reason that speaker units were coded egocentric. Such verbalizations on the part of the listener were so rare (only three cases) that they were dropped from the analysis. The measures for each of the unit codes used in the analysis were the proportion of the number of units given a particular code to the total number of listener units. For the 20 randomly chosen transcripts rated independently

by two judges, 96% of the listener units were coded in the same way.

Results

Success measures

A two-way, sex by SES combination, analysis of variance was performed for the success measures. A significant main effect on the error measure was observed only for sex, F (1, 32) = 4.68, $p < .05$. (All scores were transformed for analysis to (log (x +1)) to reduce skewness). Table 4 shows that, as in Experiment 1, the female pairs made fewer errors than the male pairs.

Insert Table 4 about here

Although time and errors were significantly correlated with each other as in Experiment 1 (r = .766, $p < .001$), no main or interaction effects were observed for the time measure. A particularly interesting finding was the striking similarity between the two experiments on the overall results for the time and success measures. In the first experiment, pairs averaged 1.5 errors; in the second experiment, the mean number of errors was 1.9. The average time in Experiment 1 of 103.8 seconds is also comparable to the average time in Experiment 2 of 114.3 seconds.

Speaker content measures

Correlation coefficients computed between each of the speaker content measures and the two success measures found the content measures to be on the whole insignificantly correlated with the success measures, unlike Experiment 1. The only exception was a significant positive correlation between the proportion of uninformative units and time, r = .364, $p < .05$.

Only one marginally significant main effect for sex indicated that, as in Experiment 1, boys used a higher proportion of egocentric units (F (1, 32) = 3.66, $p < .065$), although the proportion of egocentric units was lower than in the first experiment for both boys and girls, (mean proportion for boys = .058; mean proportion for girls = .018; compare Table 3).

Listener content measures

Listener effects were much more striking than speaker effects in the feedback situation. A sex by SES combination analysis of variance was done for each of the listener content measures. A significant sex by SES combination found for the number of listener words (F (3, 32) = 3.02, $p < .05$) is seen in Table 5. The most striking difference on this listener measure appeared for the middle- lower- SES combination in which the

Insert Table 5 about here

amount of listener speech in this SES combination was much greater for boys than for girls. The SES of the speakers appears to be important, as the sex by speaker SES analysis of variance also resulted in a significant interaction, F (1, 36) = 5.86, $p < .05$. In the male dyads listeners spoke more when the speakers were middle-SES.

Analyses of the content of listener's speech showed a marginally significant sex by SES combination interaction, F (3, 32) = 2.63, $p < .068$, for the proportion of information units. The SES of the listener appeared to be the most significant determinant of this effect as a highly significant sex by listener SES interaction was found, F (1, 36) = 7.87, $p < .01$.

While lower-SES boys occasionally offered information, lower-SES girls almost never did. The reverse was true for middle-SES girls and boys. On the other hand, a sex by listener SES interaction, F (1, 36) = 4.47, $p < .05$, shows that lower-SES girl listeners asked a higher proportion of questions than lower-SES boy listeners.

An incidental but interesting finding concerns the relationship between the content of the listener's speech and the content of the speaker's speech. The listener's affirmation units correlated positively with both the speaker's egocentric units, $r = .475$, $p < .01$, and uninformative units, $r = .450$, $p < .01$. Thus it appears that the more the speaker gave egocentric or uninformative messages to the listener, the more the listener responded yes or no. Since the great majority of affirmation responses were affirmative (i.e., "yea") rather than negative (i.e., "no, I don't see it"), this finding is counter-intuitive. A more intuitively reasonable finding would have been that the higher the speaker's proportion of egocentric and uninformative units, the more the listener would ask questions, but this was not observed.

Discussion

Although the SES of the members of the dyads seemed to be an important factor in communication efficiency, the role of SES was found to be extremely complex. It is noteworthy that SES main effects did not occur in spite of the finding that for both speakers and listeners the middle-SES group had a significantly higher mean M.A. than the lower-SES group. Only one SES pair main effect was found when feedback was not allowed. The

relatively great number of mistakes made by the lower-SES listener, middle-SES speaker pair when feedback was not allowed was not found when feedback was allowed. Because it was only this pair that resulted in a relatively high number of errors, the difficulty can neither be related simply to the SES of the speaker nor the SES of the listener. Nor can it be attributed to the content of the speakers' message because the SES pairs did not differ significantly on any of the content measures. The result does demonstrate the complexity of communication and the importance of considering both members of a communication dyad when studying social class differences in communication abilities. It also is indicative of the importance of considering interpersonal variables as well as ability.

The lack of SES main effects may be in part due to the nature of the task. Care was taken to minimize variables which may have contributed to the inferior performance of lower-SES children in past studies of communication effectiveness. The consistent finding of more egocentric speech made by lower-SES speakers was not, for example, replicated in either of these experiments. In fact it is noteworthy that egocentric speech made by the listener in Experiment 2 was so rare that it could not even be included in the analysis. The low frequency of egocentric speech is of particular interest because it is frequently considered critical to the findings of SES differences in children's efficiency in verbal communication. The findings of this study suggest that the amount of egocentric speech may be largely task dependent, and that both lower- and middle-SES children are capable of using nonegocentric speech in certain situations.

Three particular qualities of the task used in this experiment may explain both the relative lack of egocentric speech and the lack of SES differences. The task, first of all, simulated a real life task, giving directions, so may have had more meaning for the lower-SES child than the more abstract tasks used in previous studies. Secondly, the criteria for success on the task were made clear to the subjects at the outset, so that SES differences in perceptions of the task requirements would be eliminated. Thirdly, the fact that children reported that the game was fun and many asked for permission to play it again indicates that the task was probably motivating to all children.

A second explanation for the lack of SES findings concerns the nature of the lower-SES subjects, whose families were primarily working class. Glucksberg et al., (1975) in their review of social class findings in communication studies suggest that those past studies which resulted in significant social class differences were more likely to have employed subjects from an extremely deprived background. The results of this study corroborate Glucksberg et al.'s tentative conclusion, as the lower-SES sample was primarily from working class background, and SES findings were minimal.

Sex differences were considerably more striking than SES combination differences. The girls' general superiority evidenced particularly in the first experiment is somewhat surprising in light of the lack of sex differences observed in previous studies of communication in children. One explanation for the superiority of the girls might be the greater

familiarity or comfortableness with a female experimenter. This seems unlikely, however, since most of the children, both boys and girls, had female teachers.

The sex by SES interactions in Experiment 2 were the most interesting and most perplexing of all the findings. The findings do not suggest superiority of any particular sex and SES combination over others, but do suggest different strategies in approaching the task. The lower-SES boy listeners for example, when paired with a middle-SES boy speaker spoke much more than the lower-SES girl listeners did when paired with a middle-SES speaker. Explanations for this kind of interaction are highly speculative, but such results are striking evidence that communication is an extremely complex process and all dimensions, including social and interpersonal, must be considered when evaluating children's communication abilities.

The possibility of feedback generally did not appear to help the pairs accomplish the task in less time or with fewer errors, as was expected by the researchers. In fact the similarity between the two situations on these measures was striking. It did not appear to be the case that listeners simply failed to give very much feedback, as was found by Dittman (1972) in conversations with first, third, and fifth graders. Listeners did differ in their strategy (some asked questions, some offered information to aid the speakers, etc.), however, these differences were not related to the overall success of the communication interaction.

One possible explanation for the finding that the type of feedback given was unrelated to success is that the feedback given was inappropriate. It did not, for example, seem that listeners talked more to make up for uninformative messages by the speaker as measured by the content analysis of the speaker's messages. A positive correlation, in that case, would be expected between the quantity of listener's speech and the proportion of egocentric and vague communication; and a negative correlation would be expected between the quantity of listener's speech and the proportion of qualified and well qualified units. None of these correlations were significant. In fact, the more the speaker gave egocentric or uninformative messages, the more the listener responded with a simple yes or no, most often, yes.

The impression of the experimenter was that listeners were generally unable to employ usefully the opportunity to ask questions and give feedback; that in fact, they often hindered the process of communication by asking irrelevant or nondiscriminating questions. It was often the case that the listener would be observed actually pointing to two places to which he appeared to have narrowed down the possibilities, but was unable to formulate a question to which a response would enable him to eliminate one of the possibilities.

This observation has particular relevance for the classroom, in which children spend a large proportion of their time as "listeners". More research needs to be done to investigate why children might have

difficulty in articulating questions to get at information they require to understand fully the message being communicated to them.

The two experiments in this study indicate the complexity of communication on this kind of task and the possibility that different SES backgrounds and sex lead to different styles that may be equally effective in solving the task. Further research on the components of such individual and group differences in style is suggested.

The results of this study also demonstrate the importance of considering both the speaker and the listener. The different results for the different dyads suggest that other interactions: adult-child, male-female, for example, may also give different results. Communication efficiency is not a simple unitary trait attributable to the individual as has often been implied.

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Footnotes

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Table 1

Mean Number of Errors and Time by Sex and SES Combination

Experiment 1

Sex	SES Combination[a] L-L	L-M	M-L	M-M	Total
			Errors		
Girls	.4	1.4	.2	1.0	.8
Boys	1.6	4.2	2.6	.8	2.3
Total	1.0	2.8	1.4	.9	1.6
			Time[b]		
Girls	42.4	71.4	54.6	69.6	59.5
Boys	159.6	176.8	123.8	132.6	148.2
Total	101.0	124.1	89.2	101.1	103.9

[a]Speaker-Listener

[b]In seconds

Table 2

Correlation Coefficients Between Content and Success Measures

Experiment 1

Content Measures	Success Measures	
	Errors	Time
Egocentric	.36*	.32*
Uninformative	.27	.34*
Informative (1 qualifier)	-.18	.00
Informative (1 qualifier)	-.08	-.31*

*$p < .05$.

Table 3

Sex Main Effects in Speaker Content Codes

Experiment 1

Content Code	Sex		F
	Boys	Girls	
Egocentric	.14	.05	4.49*
Uninformative	.26	.14	3.22
Informative (1 qualifier)	.41	.45	.18
Informative (>1 qualifier)	.33	.40	1.18

Note. Numbers are proportions

*$p < .05$.

Table 4

Mean Number of Errors and Time by Sex and SES Combination

Experiment 2

Sex	SES Combination[a]				Total
	L-L	L-M	M-L	M-M	
	Errors				
Girls	.6	1.2	1.0	.8	.9
Boys	1.6	1.2	6.0	2.8	2.9
Total	1.1	1.2	3.5	1.8	1.9
	Time[b]				
Girls	84.2	118.6	70.6	88.6	90.5
Boys	68.8	74.8	299.2	109.8	138.2
Total	76.5	96.7	184.9	99.2	114.3

[a]Speaker-Listener

[b]In seconds

Table 5

Content Measures for Listeners Speech

and SES Combination

Experiment 2

	Girls				Boys			
SES Combination[a]	L-L	L-M	M-L	M-M	L-L	L-M	M-L	M-M
Total Words	30.6	54.2	8.6	29.2	6.0	31.6	100.6	32.0
Questions[b]	.97	.52	.88	.58	.22	.52	.58	.70
Affirmation[b] (negation)	0.0	.30	.13	.32	.67	.33	.31	.27
Information[b]	0.0	.15	0.0	.10	.11	.06	.08	.02
Repetition[b]	.03	.03	0.0	0.0	0.0	.10	.02	.01

[a]Speaker-Listener

[b]Proportion of total listener words

Figure Caption

Figure 1. Model City